Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (Currently amended) A radio frequency (RF) down-convertor with reduced local oscillator leakage, for ~~demodulating an input signal $x(t)$~~ emulating the demodulation of an input signal $x(t)$ with a local oscillator signal having frequency f, said down-convertor comprising:

a synthesizer for generating mixing signals φ_1 and φ_2 which vary irregularly over time, where:

$\varphi_1 * \varphi_2$ has significant power at the frequency f of said local oscillator signal being emulated;

neither $\varphi 1$ nor $\varphi 2$ has significant power at the frequency f of said local oscillator signal being emulated; and

said mixing signals $\varphi 1$ and $\varphi 2$ are designed to emulate said local oscillator signal having frequency f, in a time domain analysis;

a first mixer coupled to said synthesizer for mixing said input signal $x(t)$ with said mixing signal φ_1 to generate an output signal $x(t)\ \varphi_1$; and

a second mixer coupled to said synthesizer and to the output of said first mixer for mixing said signal $x(t)\ \varphi_1$ with said mixing signal φ_2 to generate an output signal $x(t)\ \varphi_1\ \varphi_2$~~.~~, said output signal $x(t)\ \varphi_1\ \varphi_2$ emulating the modulation of said input signal $x(t)$ with said local oscillator signal having frequency f.

2. (Currently amended) The radio frequency (RF) down-convertor of claim 1 wherein said synthesizer ~~further comprises:~~ is further operable to generate mixing signals φ_1 and φ_2, such that the product $\varphi_1 * \varphi_1 * \varphi_2$ will not result in a significant amount of power within the bandwidth of an input signal that the down-converter is designed to down-convert to baseband.

~~a synthesizer for generating mixing signals φ_1 and φ_2, where φ_1* φ_1 * φ_2 does not have a significant amount of power within the bandwidth of said input signal *x(t)* at baseband.~~

3. (Original) The radio frequency (RF) down-convertor of claim 2, further comprising:

a DC offset correction circuit.

4. (Original) The radio frequency (RF) down-convertor of claim 3, wherein said DC offset correction circuit comprises:

a DC source having a DC output; and

a summer for adding said DC output to an output of one of said mixers.

5. (Original) The radio frequency (RF) down-convertor of claim 2, further comprising:

a closed loop error correction circuit.

6. (Previously presented) The radio frequency (RF) down-convertor of claim 5, wherein said closed loop error correction circuit further comprises:

an error level measurement circuit and

a time varying signal modification circuit for modifying a parameter of one of said mixing signals φ_1 and φ_2 to minimize said error level.

7. (Original) The radio frequency (RF) down-convertor of claim 6, wherein said error level measurement circuit comprises a power measurement.

8. (Original) The radio frequency (RF) down-convertor of claim 6, wherein said error level measurement circuit comprises a voltage measurement.

9. (Original) The radio frequency (RF) down-convertor of claim 6, wherein said error level measurement circuit comprises a current measurement.

10. (Previously presented) The radio frequency (RF) down-convertor of claim 6, wherein said modified parameter is the phase delay of one of said mixing signals φ_1 and φ_2.

11. (Previously presented) The radio frequency (RF) down-convertor of claim 6, wherein said modified parameter is the fall or rise time of one of said mixing signals φ_1 and φ_2.

12. (Previously presented) The radio frequency (RF) down-convertor of claim 6, wherein said modified parameter includes both the phase delay and the fall or rise time of one of said mixing signals φ_1 and φ_2.

13. (Previously presented) The radio frequency (RF) down-convertor of claim 2 wherein said synthesizer further comprises:

a synthesizer for generating mixing signals φ_1 and φ_2, where said mixing signals φ_1 and φ_2 can change with time in order to reduce errors.

14. (Original) The radio frequency (RF) down-convertor of claim 1, further comprising:

a filter for removing unwanted signal components from said *x(t)* φ_1 signal.

15. (Currently amended) The radio frequency (RF) down-convertor of claim 1, wherein said mixing signal φ_2 ~~are random~~ <u>is a square wave</u>.

16. (Currently amended) The radio frequency (RF) down-convertor of claim 1, wherein said mixing signals φ_1 and φ_2 ~~are pseudo-random~~ <u>effect the modulation of an in-phase component of said input signal *x(t)*, and a complementary down-convertor with mixing signals 90 degrees out of phase, is used to effect the modulation of a quadrature component of said input signal *x(t)*</u>.

17 (Previously presented) The radio frequency (RF) down-convertor of claim 1, wherein said mixing signals φ_1 and φ_2 are irregular.

18. (Previously presented) The radio frequency (RF) down-convertor of claim 1, wherein said mixing signals φ_1 and φ_2 are digital waveforms.

19. (Previously presented) The radio frequency (RF) down-convertor of claim 1, wherein said mixing signals φ_1 and φ_2 are square waveforms.

20. (Original) The radio frequency (RF) down-convertor of claim 1, further comprising:

a local oscillator coupled to said synthesizer for providing a signal having a frequency that is an integral multiple of the desired mixing frequency.

21. (Currently amended) A method of demodulating a radio frequency (RF) signal *x(t)* with reduced local oscillator leakage comprising the steps of:

generating mixing signals φ_1 and φ_2 which vary irregularly over time, where:

φ_1 ~~and~~ * φ_2 has significant power at the frequency *f* of a local oscillator signal being emulated, ~~and~~ neither φ_1 nor φ_2 has significant power at the frequency of said local oscillator signal being emulated; and

said mixing signals $\varphi 1$ and $\varphi 2$ are designed to emulate said local oscillator signal having frequency f, in a time domain analysis;

mixing said input signal *x(t)* with said mixing signal φ_1 to generate an output signal *x(t)* φ_1; and

mixing said signal *x(t)* φ_1 with said mixing signal φ_2 to generate an output signal *x(t)* $\varphi_1 \varphi_2$.

22. (Previously presented) An integrated circuit comprising the radio frequency (RF) down-convertor of claim 1.

23-24. Canceled.

25. (Previously presented) The radio frequency (RF) down-convertor of claim 1, where said synthesizer uses different patterns to generate signals φ_1 and φ_2.

26. (Previously presented) The radio frequency (RF) down-convertor of claim 1, wherein said synthesizer uses a single time base to generate both mixing signals φ_1 and φ_2.